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09/930,172	08/16/2001	Hiromasa Tanaka	57454-168	1155

7590

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EXAMINER

MCGUTHRY BANKS, TIMA M

ART UNIT

PAPER NUMBER

1742

DATE MAILED: 08/30/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/930,172

Applicant(s)

TANAKA ET AL.

Examiner

Tima M. McGuthry-Banks

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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## DETAILED ACTION

### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsushima et al (US 4,696,581) in view of Tipton et al (US 5,910,223) and in view of Kiuchi et al (US 6,101,719).

Tsushima teaches a rolling bearing with outer and inner bearing rings and a plurality of rolling elements (column 2, lines 59 and 60). The bearing is made of carburized steel (column 1, line 8). The carbon content is 0.15 to 0.4% and the oxygen content is not more than 15 ppm (column 2, lines 63 and 64). The HRC of the surface layer of the rolling elements is not less than 58 (lines 65-67). However, Tsushmia does not teach all of the components of the steel as in Claims 1-3 or the process by which the bearing is formed as in Claim 1.

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Regarding the components of the steel in Claim 1, Tipton teaches a carburized steel article that comprises 0.08-.35% carbon, 0.3-1.7% manganese, less than 0.2-2.5% carbide-forming elements, and less than about 1.1 grain refining elements (column 2, lines 13-16). The steel is made by carburizing, quenching and austempering (column 1, line 24 and column 2, line 28). It would have been obvious to one with ordinary skill in the art at the time the invention was made to use the steel of Tipton for the rolling bearing of Tsushima, since Tipton teaches that the steel has both high surface hardness and higher toughness, without having a high core carbon content or the addition of relatively expensive carbide forming elements (column 1, lines 52-55). Regarding the presence of silicon, it would have been obvious to one with ordinary skill in the art at the time the invention was made to include silicon, since Kiuchi teaches that the addition of silicon results in good tempering softening resistance (column 6, lines 15-17). Regarding the presence of nickel, it would have been obvious to one with ordinary skill in the art at the time the invention was made to include nickel, since Kiuchi teaches that nickel enhances the hardenability as well as the toughness up to 4% (column 7, lines 26-28).

Regarding the process limitations in Claim 1, the product taught by Tsushima in view of Tipton and Aihara reads on the claimed product, and the process limitations do not have patentable weight. See MPEP §2113, especially *In re Thorpe*.

Regarding the presence of Mo or V in Claim 2, it would have been obvious to one with ordinary skill in the art at the time the invention was made to include molybdenum in the steel

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composition, since Kiuchi teaches that Mo and V form hard carbides and increases the tempering softening resistance in an amount of 5% or less Mo and 4.0% or less V (column 7, lines 15-26).

Regarding the total content of Mn and Ni in Claim 3, Tsushima in view of Tipton and Aihara teaches 0.3-1.7% Mn and 0.3-4.0% Ni, which total reads on at least 1.5%.

4. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto et al (US 5,997,661) in view of Kiuchi '719.

Matsumoto teaches heat-treating bearings with an outer race, an inner race, and roller (Table 6). The bearings undergo carburizing or carbonitriding (Table 2), quenching, and tempering at temperatures such as 220° C, 230° C, 240° C, and 250° C (Table 6). The concentration of the bearing is less than 1.1% C, less than 1.5% Mn, less than 3.5% Cr, less than 4.5% Ni, and less than 15 ppm O (column 30, Claim 1). However, Matsumoto does not specifically teach a concentration of Si as claimed.

Kiuchi teaches manufacturing a rolling bearing from steel by carburizing and tempering (column 4, lines 45-47). The steel contains 0.3-1.5% Si (column 6, line 11). It would have been obvious to one with ordinary skill in the art at the time the invention was made to include silicon in the bearing of Matsumoto, since Kiuchi teaches that the addition of silicon results in good tempering softening resistance (column 6, lines 15-17).

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto in view of Kiuchi as applied to Claim 4 above, and further in view of Okayama et al (US 6,306,227 B1).

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Matsumoto in view of Kiuchi discloses the invention substantially as claimed. However, Matsumoto in view of Kiuchi does not disclose a second quenching step as claimed. Okayama teaches a rolling bearing ring and element made of carburized and carbonitrided steel (abstract). After carburizing, the steel undergoes secondary quenching (column 5, lines 35-37). It would have been obvious to one with ordinary skill in the art at the time the invention was made to add a second quenching step, since Okayama teaches that a second quenching results in a control of surface hardness and core hardness to prescribed values (column 5, lines 38-40).

6. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto in view of Kiuchi and Okayama as applied to Claims 4 and 5 above, and further in view of Hengerer et al (US 4,913,749).

Matsumoto in view of Kiuchi and Okayama disclose the invention substantially as claimed. However, Matsumoto in view of Kiuchi and Okayama does not disclose annealing before the second quenching as claimed in Claim 6. Hengerer teaches case-hardening rolling bearing elements with an annealing step before cooling (column 4, lines 18-21). It would have been obvious to one with ordinary skill in the art at the time the invention was made to add an annealing step before the second quenching, since Hengerer teaches that this step allows for relatively soft rolling bearing elements to be machined after carburization and before hardening and austenization of the carburized layer (column 4, lines 21-24). Regarding Claim 7, Matsumoto teaches 4.5% or less Ni and 1.5% or less Mn, which total reads on the claimed range.


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***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tima M. McGuthry-Banks, whose telephone number is 703-308-1917. The examiner can normally be reached on 9:30-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King, can be reached on 703-308-1146. The fax numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist, whose telephone number is 703-308-0651.

  
Tima M. McGuthry-Banks  
Examiner  
Art Unit 1742

August 28, 2002